



Demand-Side Opportunities: An Untapped Resource for Managing Electricity Costs?

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Energy 2001

Kansas City, MO

June 3-6, 2001

Overview of Presentation



- Current federal electricity market conditions
- Threats to electric system reliability: A national challenge/federal opportunity
- The new DSM programs: resource acquisition and reliability
- The California example
- Cinergy's program is most aggressive in the nation

Current and Future Federal Electricity Market Conditions

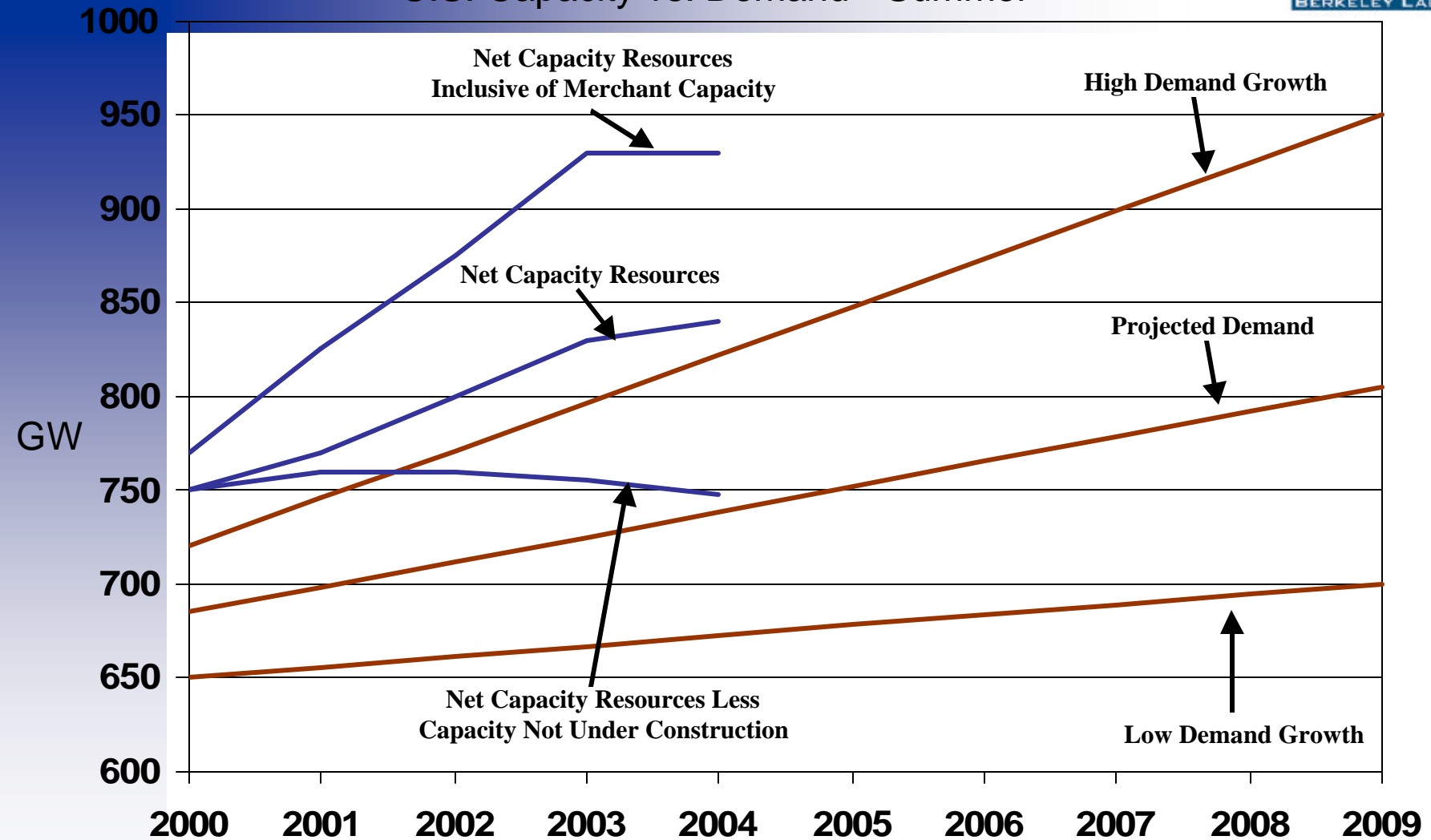


- Agencies served mostly by regulated monopoly utilities as competitive service providers terminate agreements and elect not to offer service; emergence of active, competitive markets uncertain in near future
- Electricity prices have risen dramatically and little price relief is in sight
- Doesn't appear that agencies will receive significant capital budgets for energy projects
- Persistent rolling black-outs threatening in CA and other regions
- Traditional DSM programs being expanded; new programs developed

Reliability Challenges are National



U.S. Capacity vs. Demand - Summer

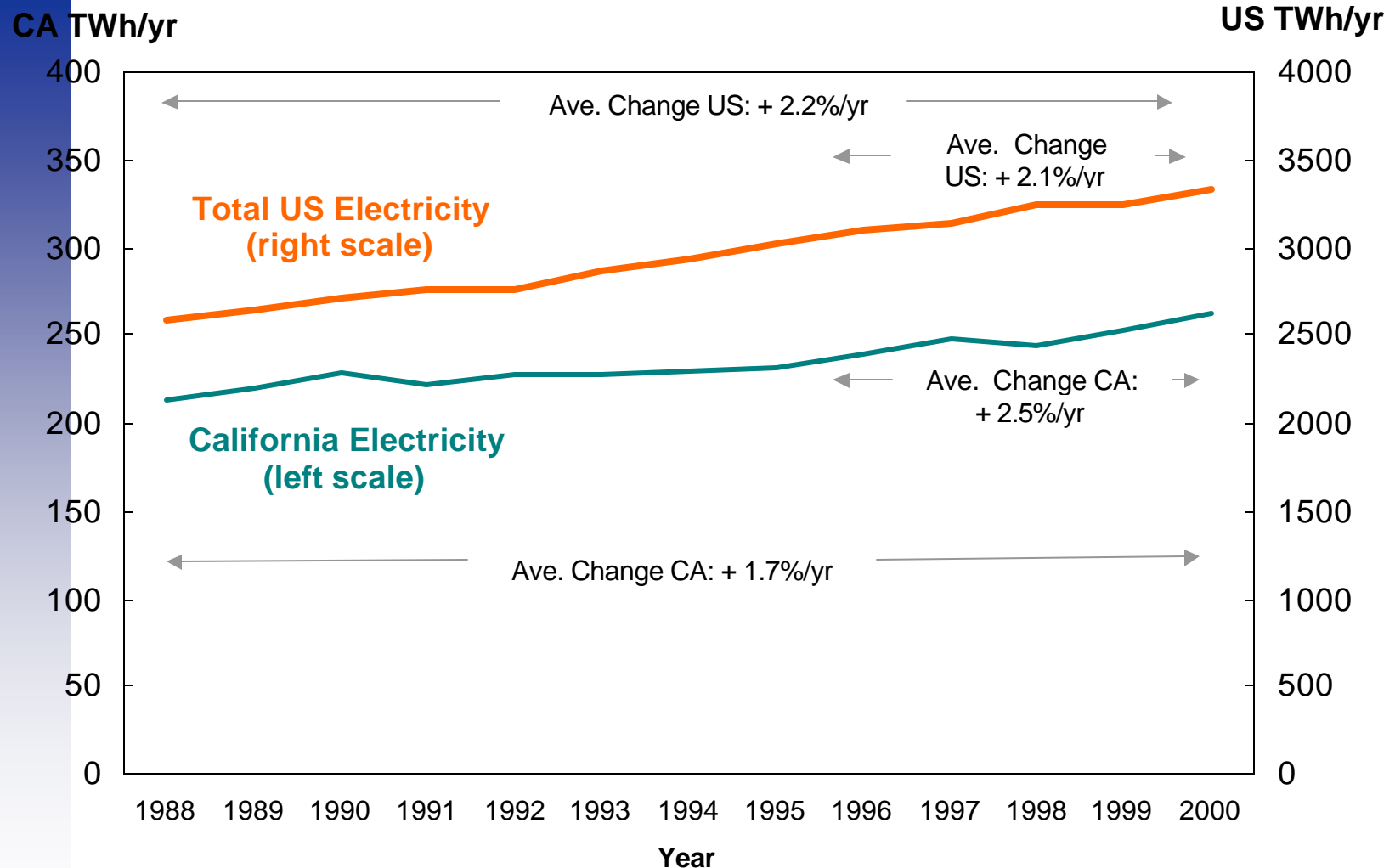


Source: NERC Reliability Assessment 2000-2009

Demand Growth Has Been Moderate



Trends in US and California Electricity Consumption (1988-2000)



Utilities/Transmission Operators and Customers Have Overlapping Interests



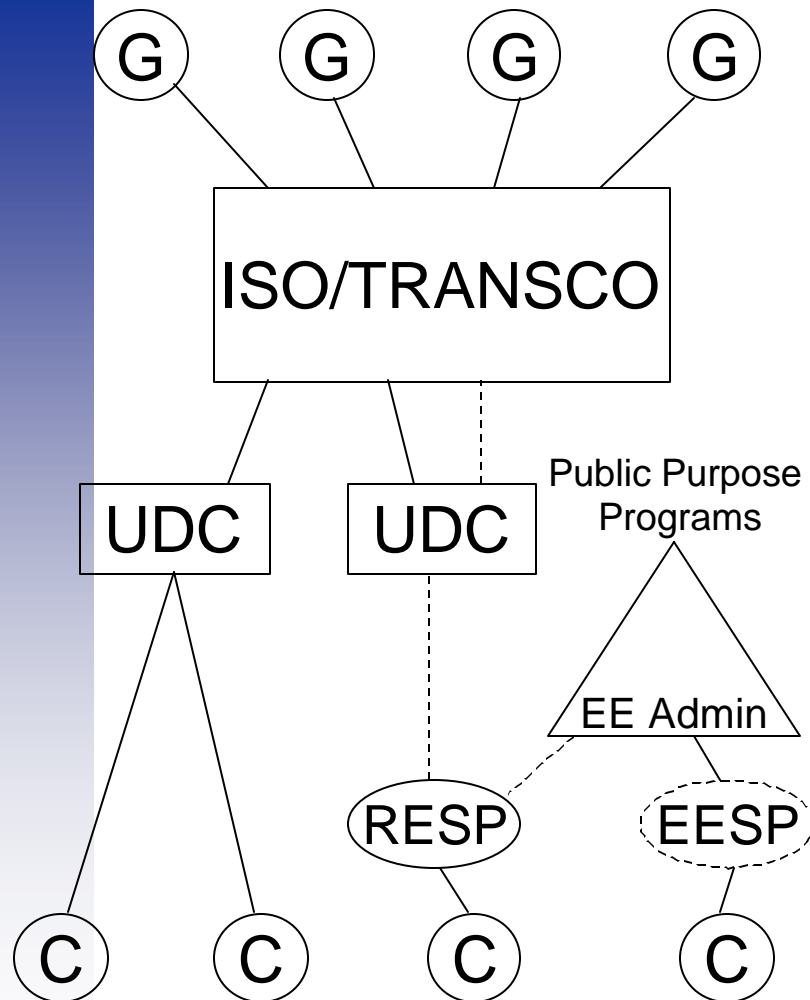
- Utilities/RTOs/ISOs
 - Maintain reliability
 - t Generation
 - t Demand reductions
 - Acquire resources at least cost
- Customers
 - Minimize energy-related expenses
 - Avoid forced curtailments/outages
 - Contribute as good corporate citizens

Historically, DSM Incentives are EE Project Related



- Federal customers use EE incentives to reduce project capital cost, receive rebates or credit towards energy
- DSM (EE) program incentives typically pay only portion of project cost
- Electricity bills are reduced when project is paid off
- These programs have provided cost-effective resources, but not targeted at reliability, peak demand

New Market Structure and DSM Opportunities



- Bid load decrements
- Provide ancillary services
- Reduce load growth
- Alternative to T&D expansion
- Provide cost-effective energy efficiency services

General Strategies for Reducing (Peak) Demand and Saving Money



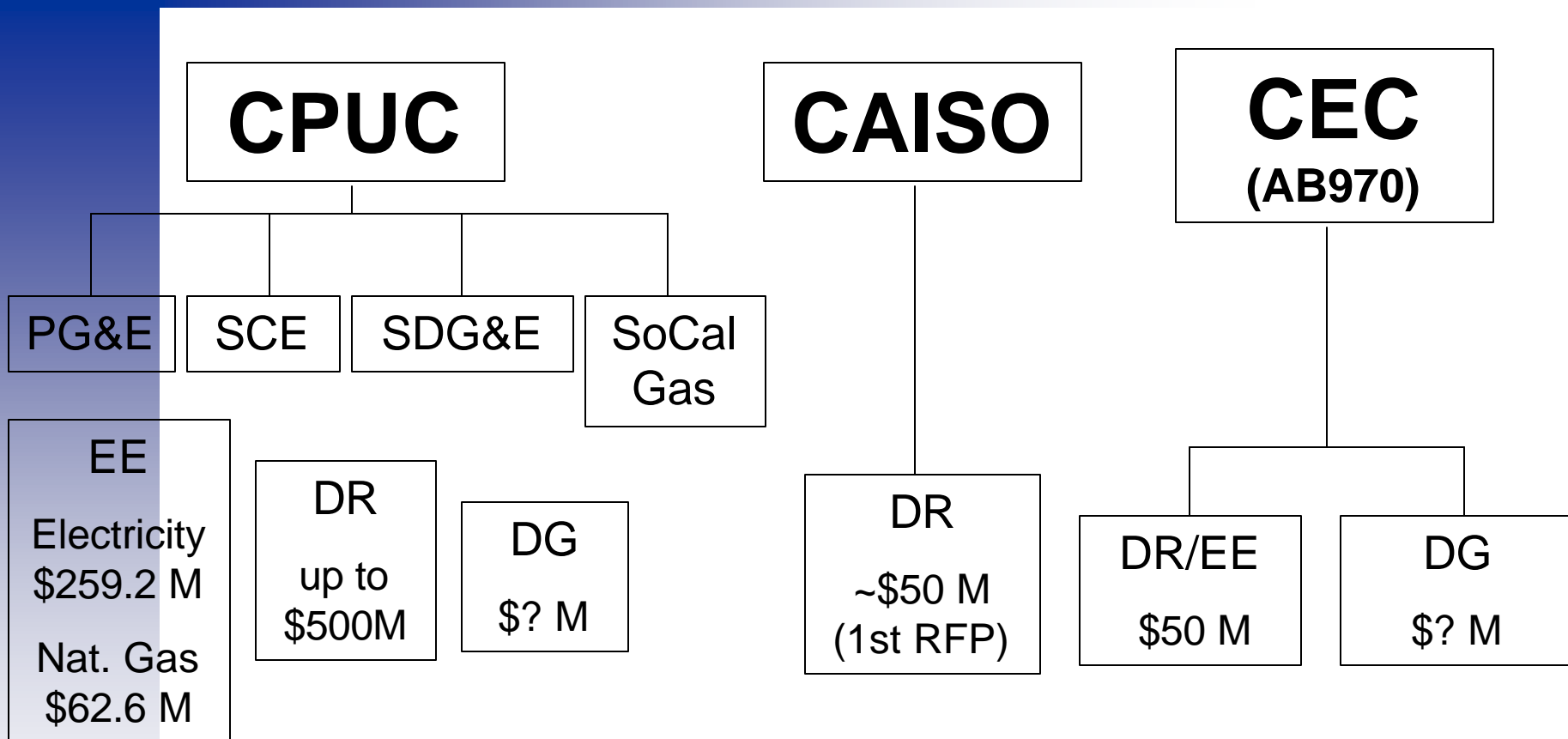
- Curtailment/conservation
 - Use less energy; reduce operations or amenities
- Energy efficiency
 - Use less energy to accomplish the same amount
- Load management
 - Shift operations to periods of lower electricity costs
- Self-generation
 - Install back-up or distributed generation

Demand Response Program Types



- **Traditional C/I Interruptible Tariffs**
 - Up-front payment; typically bill or rate discounts for curtailments to Firm Service Level
- **Direct Load Control**
 - Utility control of customer loads (e.g., cycle or shed a/c, water heating, pool pump)
- **VDRP - Call option**
 - Customers select Strike Price. LSE can exercise the Call Option and require customer to reduce load or face penalties when projected Mkt. Price > Strike Price
- **VDRP - Quote option**
 - Customers specify when and at what price they are willing to voluntarily curtail demand ("pay-per-interruption event")
- **Dynamic Pricing (e.g., real-time pricing)**

Overview of CA Programs and Funding



EE = energy efficiency

DR = demand response/LM

DG = distributed generation

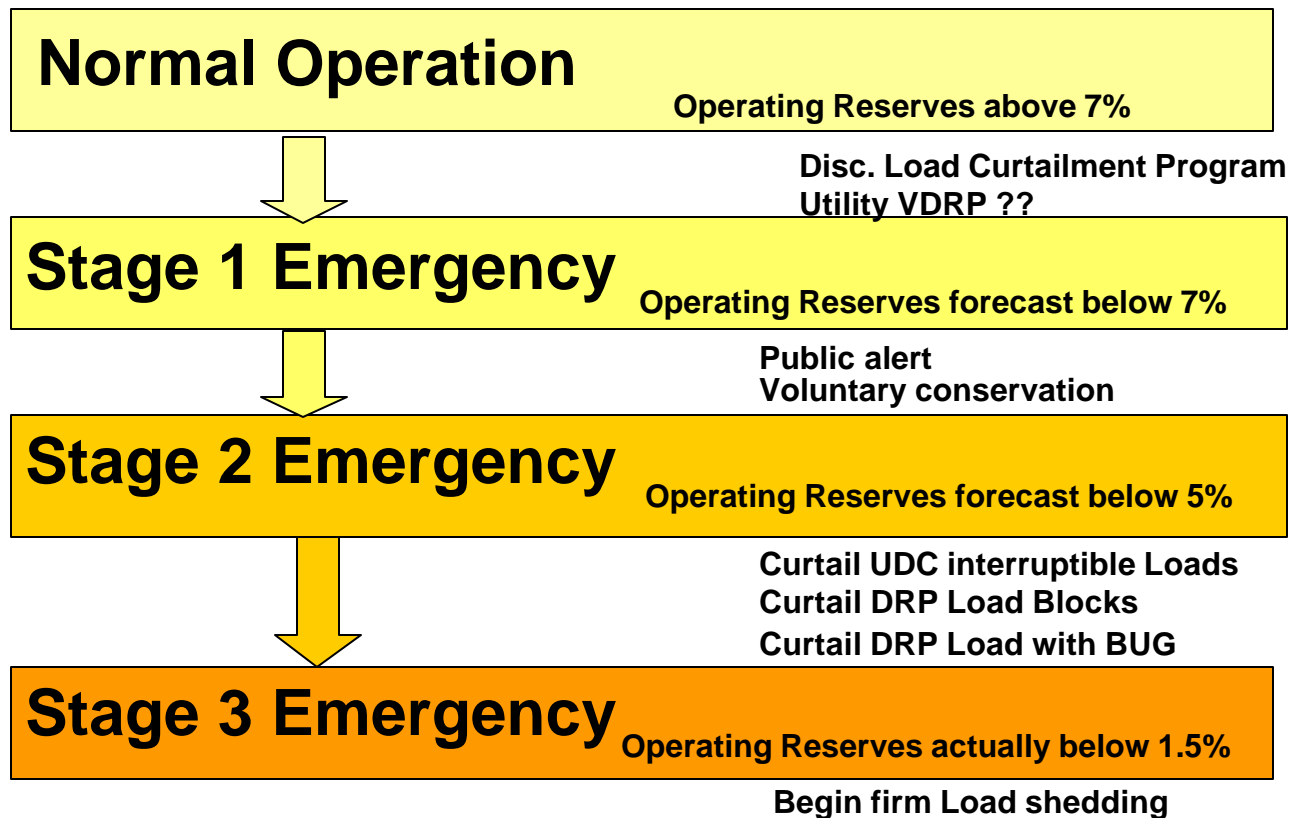
Major Components of California Peak Demand



End Use/Subsector	Percent of Peak Demand
Commercial AC	14%
Residential AC	14%
Assembly Industries	13%
Commercial Interior Lighting	11%
Residential Miscellaneous	7%
Commercial Other	7%
Agriculture and Pumping	5%
Process Industries	5%

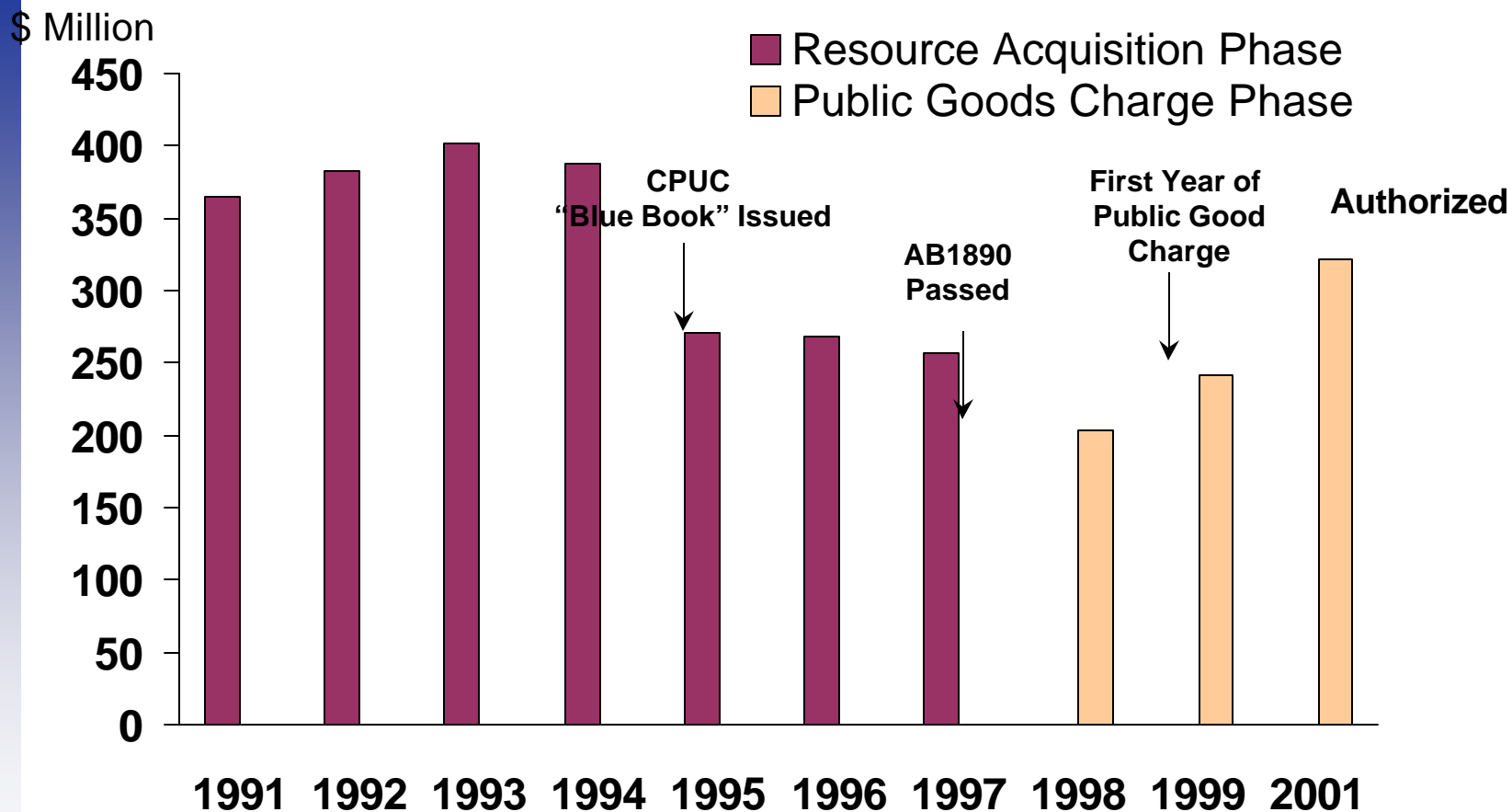
Source: California Energy Commission

CA ISO: Operation of Demand Response Programs



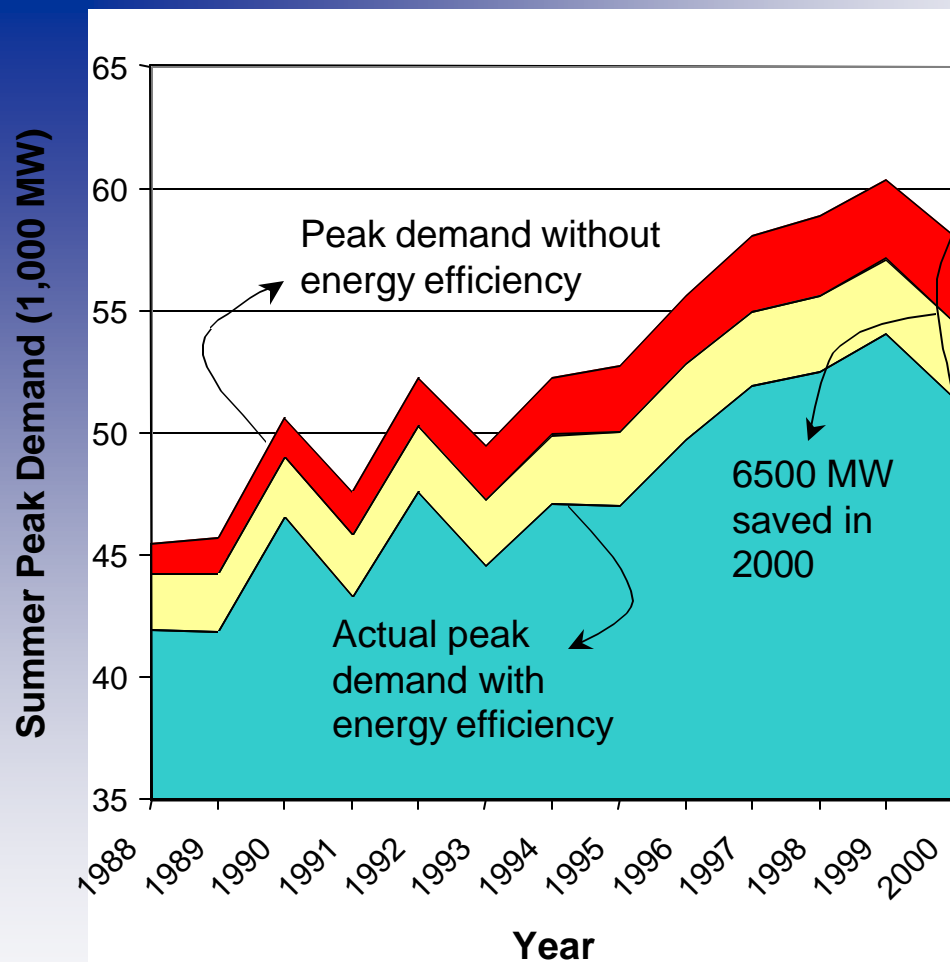
BUG = Back-up Generator

California Energy Efficiency Spending



Source for historical data: *DSM Expenditures and Cost-Effectiveness: Trend and Patterns, 1998- Current. Office of Ratepayer Advocates, CPUC. August, 1999.*

Impact of Energy Efficiency in California



- CA energy efficiency programs have reduced peak demand by 6500 MW from 1975-2000
- Saved 2800 MW from 1990-1999, which met 30-35% of peak demand growth during that period
- Excludes C/I non-firm “interruptible” rate program which offered another ~2500 MW

Barriers to Reducing Demand in California



- Retail electricity prices are not well-aligned with current wholesale market prices; existing metering is inadequate
- Consumers are not well-informed regarding electricity system costs to serve peak-loads and have only limited knowledge of strategies to reduce or shift load away from peaks
- Reducing or curtailing demand may have significant economic costs and impacts on businesses/operations
- Energy efficiency and distributed generation products are facing (potential) supply bottlenecks
- The current business and regulatory environment increases the complexity of decision making
- There is confusion among customers regarding available programs

California C/I “Interruptible” Program: An Important Reliability Resource



- 15% Rate discounts for ~1500 large customers (\$220M/year) to curtail up to 100-150 hrs/year on 25-30 occasions
- Available curtailable peak load (MW): PG&E (500), SCE (1800), and SDG&E (40)
- CA would have had “rolling blackouts” on at least 5 occasions in 2000 in absence of C/I Interruptible program
 - Program demand reductions up to 2190 MW (8/2/2000)
- Bad news: Customers reacted negatively to frequent interruptions
 - ~600 MW at SCE failed to interrupt when requested and incurred substantial penalties (\$92M)
 - 25%, or 124 MW, of PG&E’s load dropped out

Energy Efficiency Programs in CA of Interest to Federal Customers



Program

- Standard Performance Contract
- Express Efficiency
- Savings by Design
- Third Party RFP

Target Market

- C/I Customers with >500 kW
- Small and Medium C/I
- C/I New Construction & Major Renovation
- All

Cinergy's PowerShare Pricing Program is Most Aggressive in U.S.



- Menu of demand-response offerings
 - CallOption (four strike prices, two payment plans, four options to reduce Summer usage)
 - QuoteOption (day-of program; no risk; all year)
- Over 90% of large C/I loads signed up
- Utility Motivation
 - Financial hedge against wholesale price volatility & a physical hedge against supply uncertainty

Cinergy's Power Share Program: Results



- Market response
 - 312 large customers signed up; 2500 MW of load
 - 2000: mild summer with no operation; ~440-600 MW of curtailable load during summer peak with high prices
 - 1999: 200 MW of demand reductions with prices as high as \$850/MW
- Utility role
 - Programs require significant upfront investment in E-commerce
 - Advisor for every customer
 - 2001 Goal -- sign up all 750 customers in 250-500 kW size range